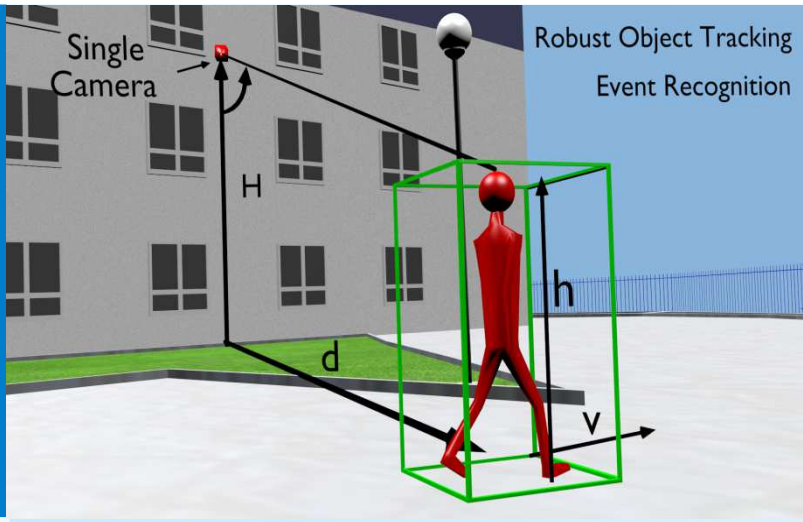
Poznań University of Technology
Chair of Multimedia Telecommunications and Microelectronics

Intelligent Video Surveillance System with Human Activity Recognition



What is actually happening in your monitored area? Our Intelligent Video Surveillance System with Human Activity Recognition – provides unique real-time capabilities to answer that question, by using state-of-the-art single camera image processing technologies.

In the area of surveillance, automated systems to observe pedestrian traffic areas and detect dangerous action are becoming important. Many such areas currently have surveillance cameras in place. However, all of the image understanding and risk detection is left to human security personnel. This type of observation task is not well suited to humans, as it requires careful concentration over long periods of time. Therefore, there is clear motivation to develop automated, intelligent, vision-based monitoring systems that can aid a human user in the process of risk detection and analysis.

The presented system is a unique global solution which automatic detects of such behavior as fainting, a fight or a cry for help. The developed system uses only one typical camera. It should be emphasized that the global market has not competitive solutions.

The system offers automatic recognition of targeted behaviors of human activity. Our solution based on advanced methods of people event modeling (a hybrid solution of HMM-based automat, authors proposal of pose descriptors) and different method of classification (SVM, Bayesian classifier, Neural Network) is characterized by high score of detection.

Techical background

- Fully automatic system
- Detection of people event: help, syncope, fight
- Localization of people position on actual view
- Information about the object: a height, a speed of movement, a direction of movement
- Robust to weather conditions
- Real-time processing



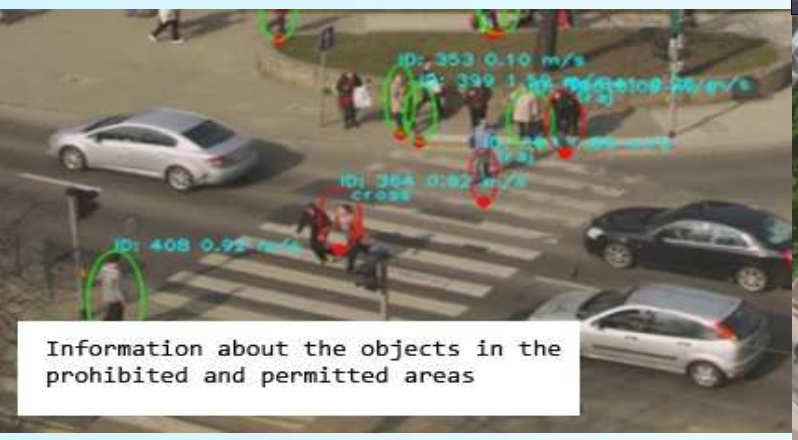
Benefit

- Single camera
- Independence of additional technical equipment
- Metadata set
- Easy creating of event reports
- Easy integration with existing video surveillance systems

Additional features:

- Define areas of interest (permitted, restricted)
- Analysis of the movement of objects in time
- Information about the trajectory of objects (an object wandering about, fight, potential pickpocket)
- Detection of motion objects in the restricted areas
- Presentation the results on Google Maps images
- Camera tampering detection







Activity Recognition

The software tracks individual pedestrians as they pass through the field of vision of the camera, and uses vision algorithms to classify the motion and activities of each pedestrian. The tracking is accomplished through the development of a position and velocity path characteristic for each pedestrian using a Kalman filter. With this information, the system can bring the incident to the attention of human security personnel.

Tracking People with Probabilistic Occlusion Reasoning

Tracking of people in crowded scenes is challenging because people occlude each other when they walk around. The latest revision of our person tracker uses adaptive appearance models that explicitly account for the probability that a person may be partially occluded. All potentially occluding targets are tracked jointly, and the most likely visibility order is estimated (so we know the probability that person A is occluding person B). Target size adaptation is performed using calibration information about the camera, and the reported target positions are in real-world coordinates.

CONTACT

Dr Sławomir Maćkowiak (smack@multimedia.edu.pl)

Chair of Multimedia Telecommunications
and Microelectronics

Poznań University of Technology
ul. Polanka 3, 60-965 Poznań, Poland

phone: +48 61 6653900
email: office_cmtm@put.poznan.pl,
office@multimedia.edu.pl
www: www.multimedia.edu.pl